REMARKS

Claims 1 and 3-13 are active and under consideration in this case.

REQUEST FOR RECONSIDERATION

During the previous discussion with Examiner Kastler on October 14, 2005, samples of the presently claimed insulating back-up material ("PYROFLOW") and of Doza et al. ("DRI-LITE 65A"), as manufactured by the Assignee, Allied Mineral, were displayed for inspection along with corresponding product specification sheets as well as a product specification sheet for "DRI-LITE 79 AC." During this discussion the important differences between the subject matter of claims 1 and 3-13 and Doza et al. were noted.

Applicant's U.S. representative has retained these samples, and they are, thus, available if the Examiner deems further inspection to be warranted.

Although back-up insulating materials are known in the aluminum industry, such as WOOLITE®, such materials entail the use of water in their preparation. Hence, any residual water must be removed completely as the back-up insulating material comes into contact with molten aluminum. This has proved to be problematic. See page 1, lines 11-30 of the present specification.

Other conventional back-up insulating materials, such as DRI-LITE®, are not free-flowing and require the use of a vibrator for installation. See page 2, lines 1-5 of the present specification.

The subject matter of present claims 1 and 3-13 avoids the above disadvantages by providing a back-up insulating material which is, at once: 1)water-free, 2)free-flowing, 3)of low density, 4)of low thermal conductivity and 5)free of organics, particularly organic binders.

In particular, present claim 1 recites a free-flowing dry back-up insulating material having a thermal conductivity ranging between about 0.8 and about 1.8 $BTU \cdot in/ft^2 \cdot h \cdot °F$, and a setting temperature lower than 400°F, wherein the material consists essentially of:

a) from 67 to 96% by weight of fly-ash containing cenospheres,

b) from 2 to 15% by weight of a heat-sensitive binder selected from the group consisting of boric acid and anhydrous boron oxide,

c) from 2 to 7% by weight of a non-wetting agent selected from the group consisting of calcium fluoride, magnesium fluoride and barium sulphate,

d) from 0 to 10% by weight of a heat expandable material selected from the group consisting of vermiculite and graphite; and

e) from 0 to 1% by weight of a dust suppressant.

Claims 1, 3 and 5-13 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Doza et al. in view of Benson and Japanese '773.

However, none of these references, either alone or in combination, discloses or suggests the present invention.

Doza et al. merely describes a back-up insulating material which contains: 1) a filler light weight material, and 2) a matrix material. A heat-activating bonding agent may be used, but is clearly optional.

Notably, this reference describes the use of many different filler light weight materials, which may be selected from:

> ...perlite, vermiculite, expanded shale, expanded fireclay, expanded alumina silica hollow spheres, bubble alumina, sintered porous alumina, alumina spinel insulating aggregate, expanded mullite, cordierite, and anorthite...See the Abstract.

Further, Example 1 at columns 12-13 describes the use of perlite as the filler light weight material, while Example 2 at columns 13-14 describes the use of alumina/spinel insulating aggregate as this material. Importantly, this reference

provides neither a description nor a suggestion to use fly-ash containing cenospheres in a back-up insulating composition.

While Doza et al. do describe "expanded alumina silica hollow spheres," such spheres are clearly not the same as fly-ash containing cenospheres as claimed.

Thus, Doza et al. fails to either disclose or suggest the present invention.

Moreover, neither Benson nor Japanese '773 corrects the deficiencies of Doza et al.

Benson merely describes the use of non-wetting agents in imparting improved resistance to molten metal of a refractory composition, while Japanese '773 merely discloses the inclusion of calcium fluoride in a refractory composition. Clearly, even the combined teachings of these two references fail to adequately augment Doza et al. in placing one skilled in the art in possession of the present invention. Further, even the combined disclosures of all three cited references would fail to enable one skilled in the art to practice the subject matter of present claims 1 and 3-13.

However, even assuming, arguendo, that the subject matter of present claims 1 and 3-13 would have been obvious to one skilled in the art at the time the present invention was made,

attached to this Response is the executed Rule 132 Declaration of Sylvain Tremblay, the inventor.

Incorporated into the Declaration are three Product Bulletins, one for DRI-LITE® 79AC and another for DRI-LITE® 65A, of Allied Mineral Products, the assignee of Doza et al.. A third product sheet for "PYROFLOW" of the present invention as claimed is also attached. These Bulletins were discussed with the Examiner on October 14, 2005. Several points are worthy of note.

First, both the 65A and 79AC product sheets describe that these "aluminum-silicate based insulating dry-vibratable" products contain in excess of 80% of Al_2O_3 (alumina) and SiO_2 (silica). Thus, the total amounts of alumina and silica used in these products are comparable to the amount of fly-ash containing cenospheres used in present claim 1, and as exemplified by the Example in the present specification.

Second, however, the criticality of using the claimed fly-ash containing cenospheres as opposed to any other type of alumina/silica mixture may be readily appreciated by inspecting the much lower thermal conductivities afforded by the present invention as compared to those of DRI-LITE® 65A and 79AC - for comparable temperatures.

Notably, the thermal conductivities of DRI-LITE® 65A, and DRI-LITE® 79AC are 1.80 and 2.70, respectively at 800°F. At the comparable temperature of 732°F, "PYROFLOW" of the present invention has a thermal conductivity of 1.19. This is the same result for the Example in the present specification. Even at the high temperature of 1,200°F, the thermal conductivities for DRI-LITE® 65A, DRI-LITE® 79AC and "PYROFLOW" are 2.00, 3.10 and 1.82, respectively.

Thus, the thermal conductivities of the subject material of present claim 1 are uniformly lower than those of the compositions of Doza et al.

Clearly, one skilled in the art would have no reason from the prior art of record to expect that the use of fly-ash containing cenospheres in a back-up insulating composition would result in a material having a greatly reduced thermal conductivity. Yet, such a result is most important for the back-up insulating material as claimed.

Additionally, as noted above, during the discussion with Examiner Kastler, several samples were displayed for inspection. They were:

a) DRI-ITE 65A "as received" (100g);

b) DRI-LITE 65A "heated at 500°C for 2 hrs" (100g);

c) PYROFLOW "as received" (100g); and

d) PYROFLOW "heated at 500°C for 2 hrs (200g).

The visual and tactile observations made from these samples were as follows:

First, both DRI-LITE 65A samples a) and b) appear and feel as a rough, grainy composition, and when agitated, move as a rough, grainy composition with no fluidity.

Second, in contrast, PYROFLOW sample c) appears and feels as a fluid, fine dust, and when agitated, exhibits a notable fluidity.

Third, PYROFLOW sample d), which was heated at 500°C for 2 hours, has the appearance of a finished, solid product in the shape of a wheel. This is because of the binder content, which binder sets at a temperature of lower than 400°F. In contrast, the DRI-LITE 65A sample b) remained as a rough, grainy powder even after being heated to 500°C for 2 hours. This latter difference is due to the incorporation of a binder in the PYROFLOW composition which has a setting temperature of less than 400°F.

By using either anhydrous boron oxide or boric acid, a low setting temperature is achieved for the present material, i.e., less than 400°F. Doza et al. fails to make any distinction

between organic and inorganic binders. See column 4, lines 51-61. Further, this reference fails to either disclose or suggest the use of either boric acid or anhydrous boron oxide in order to achieve a low setting temperature.

Fourth, none of the references of record either discloses or suggests the claimed combination of fly-ash containing cenospheres and boric acid and/or anhydrous boron oxide.

With the above differences between the presently claimed back-up insulating material and the products of Doza et al. in mind, Sylvain Tremblay has expressed the conclusion that the claimed back-up insulating material is both important and commercially significant. Further, Mr. Tremblay has expressed the opinion that the results afforded by the presently claimed back-up insulating material would not have been expected by one skilled in the art at the time the present invention was made.

Clearly, any presumption of obviousness for the subject matter of the present claims is rebutted by the above comments and Rule 132 Declaration of Mr. Tremblay, including the attached product bulletins.

Hence, this ground of rejection is believed to be unsustainable and should be withdrawn.

Accordingly, in view of all of the above, this application is believed to be in condition for allowance. Early notice to this effect is earnestly solicited.

Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 07-1337 and please credit any excess fees to such deposit account.

Respectfully submitted,

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